CLAIMS

Sub A2

1. A method of fabricating a bioelectronic component, the method comprising the steps of:

    a. providing a batch of nanoparticles having submicron sizes and a selected electrical characteristic;

    b. attaching at least one biological material to the nanoparticles so as to form shells of the biological material therearound;

    c. depositing the nanoparticles onto a surface; and

    d. associating the deposited nanoparticles with at least one electrical contact to facilitate an electrical measurement thereof, the electrical measurement being affected by the biological material.

2. The method of claim 1 in which the nanoparticles associate with said electrical contact by means of self-assembly.

3. The method of claim 1 in which the nanoparticles associate with said electrical contact by means of electrostatic assembly.

4. The method of claim 1 wherein the nanoparticles are semiconductive.

5. The method of claim 1 wherein the nanoparticles are conductive.

6. The method of claim 1 wherein the nanoparticles, surrounded by the biological material, collectively act as an insulator.

Sub A3 7. The method of claim 1 wherein the component is a transistor.

8. The method of claim 1 repeated at a plurality of locations on a substrate to form an array of bioelectronic components.

Sub A4 9. The method of claim 1 further comprising the steps of:

e. providing a second batch of nanoparticles having submicron sizes and a selected electrical characteristic;

f. depositing the second-batch nanoparticles onto a surface; and

g. sintering the second-batch nanoparticles to form a continuous, uniform layer exhibiting the second-batch selected electrical characteristic, the layer having a surface, the nanoparticles surrounded by the biological material being deposited onto the layer surface.

10. The method of claim 9 further comprising the step of forming the electrical contacts according to steps comprising:

h. providing a third batch of electrically conductive nanoparticles having submicron sizes;

i. depositing the third-batch nanoparticles in contact with the layer derived from the second-batch nanoparticles; and

j. sintering the third-batch nanoparticles to form the contacts, the contacts being in contact with the nanoparticles surrounded by the biological material following deposition thereof.

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11. The method of claim 10 further comprising the steps of repeating steps (a)-(j) at a plurality of locations on a substrate to form an array of bioelectronic components.

12. The method of claim 1 wherein the biological material comprises at least one nucleic acid.

13. The method of claim 1 wherein the biological material comprises at least one protein.

14. A method of fabricating a bioelectronic component, the method comprising the steps of:

a. providing a batch of nanoparticles having submicron sizes and a selected electrical characteristic;

b. attaching at least one biological material to the nanoparticles so as to form shells of the biological material therearound, the surrounded nanoparticles having an average size;

c. providing a pair of electrical contacts spaced apart to accommodate one or more nanoparticles; and

d. causing one or more surrounded nanoparticles to be disposed between and bridge the contacts.

15. The method of claim 14 in which said nanoparticle disposed between electrodes is realized by self-assembly.

16. The method of claim 14 in which said nanoparticle disposed between electrodes is realized by electrostatic assembly.

17. The method of claim 14 wherein the component is a single-electron transistor.

18. The method of claim 14 repeated at a plurality of locations on a substrate to form an array of bioelectronic components.

19. The method of claim 14 wherein the device is formed according to steps comprising:

a. providing a batch of electrically conductive nanoparticles dispersed in a carrier medium and having submicron sizes; and

b. applying an electric field to the dispersion so as to form a chain of nanoparticles.

20. The method of claim 14 wherein the biological material comprises at least one nucleic acid.

21. The method of claim 14 wherein the biological material comprises at least one protein.

22. A bioelectronic component fabricated in accordance with claim 1.

23. A bioelectronic component fabricated in accordance with claim 14.

24. A method of fabricating a bioelectronic component, the method comprising the steps of:

a. providing a batch of nanoparticles having submicron sizes and a selected electrical characteristic;

b. attaching at least one biological material to the nanoparticles so as to form shells of the biological material therearound;

c. depositing the nanoparticles onto a surface; and

d. associating the deposited nanoparticles with at least one electrical contact to facilitate the electrical control of said biological material.

25. The method of claim 24 repeated at a plurality of locations on a substrate to form an array of bioelectronic components.

26. A method of fabricating a bioelectronic component, the method comprising the steps of:

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a. providing a batch of nanoparticles having submicron sizes and a selected electrical characteristic;

b. depositing the nanoparticles onto a surface;

c. sintering the batch of nanoparticles to form at least one layer of an electrical device; and

d. associating a biological material with at least one layer of said electrical device to facilitate an electrical measurement thereof, the electrical measurement being affected by the biological material.

27. The method of claim 26 repeated at a plurality of locations on a substrate to form an array of bioelectronic component.

Sub A6

28. The method of claim 26 in which said electrical device is a transistor.

Sub C2

29. The method of claim 26 in which said electrical device is a microelectromechanical device.

30. The method of claim 26 in which said device is a microfluidic device.